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Mucoid-producing lesion following hip arthroplasty

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ABSTRACT

A 54-year-old patient with a history of total hip arthroplasty (THA) presented with recurrent bladder infections, gross hematuria, and sediment in urine. The urinary complaints were unresponsive to transurethral resection and partial cystectomy. On further evaluation, a communicating fistulous tract was discovered between the site of hip arthroplasty, ischiorectal fossa, and bladder. Bladder involvement as a morbid delayed complication of total hip arthroplasty is an unusual finding, particularly in the form of a mucoid-producing lesion and vesicoacetabular fistula. Similarly unusual irritative urological symptoms unresponsive to treatment should prompt consideration of potential orthopedic hardware involvement.

KEYWORDS Bladder lesion; complication; fistula; hematuria; total hip arthroplasty

We report the case of a patient with a history of right total hip arthroplasty (THA) presenting with blood, tissue, and sediment in the urine with the unusual diagnosis of a communicating fistulous tract between the site of hip arthroplasty, ischiorectal fossa, and bladder with recurrent bacterial infection. This case involves delayed prosthetic joint infection some 4 years after initial THA with rare urological manifestations.

CASE PRESENTATION

A 54-year-old woman 4 years after right THA presented for urological consultation following 1 year of intermittent gross hematuria, tissue and sediment in the urine, and associated irritative voiding symptoms of dysuria and frequency. Computed tomography (CT) with contrast prior to the visit was negative for an abdominopelvic abnormality and made no note of hardware displacement. Cystoscopy revealed a right lateral bladder lesion with mucoid production. The patient experienced persistent symptoms despite undergoing transurethral resection of bladder tumor (TURBT), with the pathologic analysis showing acute and chronic cystitis with polypoid architecture negative for dysplasia or neoplasia. Repeat CT after TURBT with contrast demonstrated a fistulous tract extending from the right perirectal fascia to the right ischiorectal fossa. Robot-assisted laparoscopic partial cystectomy was performed; the specimen had similar findings with no apparent malignancy identified. Reassessment after recurrence of symptoms included negative fluorescence in situ hybridization cytology and colonoscopy. Repeat cystoscopy demonstrated recurrence of a right lateral bladder lesion with mucoid production at the site of resection. A CT cystogram showed an ill-defined 5×4 cm fluid collection in the right pelvis adjacent to the bladder concerning for recurrent or persistent ischiorectal abscess fistulation of unknown etiology to bladder.

The patient was referred to our center for further evaluation. CT urogram showed no abnormality of the collecting system. Acetabular medial wall violation by the acetabular component of the hardware was illustrated, not documented on previous imaging. Urinalysis showed persistent pyuria and hematuria with two urine cultures positive for *Staphylococcus aureus*. Cystoscopy demonstrated a nonhealing 1 to 2 cm tract on the right posterior bladder wall with purulent efflux *(Figure 1a)*. A right retrograde pyelogram and cystogram revealed no extravasation of contrast *(Figure 1b)*; however, contrast injected into the fistulous tract with an open-ended ureteral catheter from the right side of the bladder toward hardware obviously demonstrated a fistulous tract and right acetabular hardware involvement *(Figure 1c)*. Staged fistula repair was performed with a multidisciplinary approach utilizing both orthopedic and urologic surgical teams.

Partial complicated cystectomy began with cystourethroscopy with double-J stent placement followed by dissection down to the rectus fascia through a midline incision, but inflammatory changes and dense adhesions between the bladder and pelvic sidewall called for an intraperitoneal approach. The

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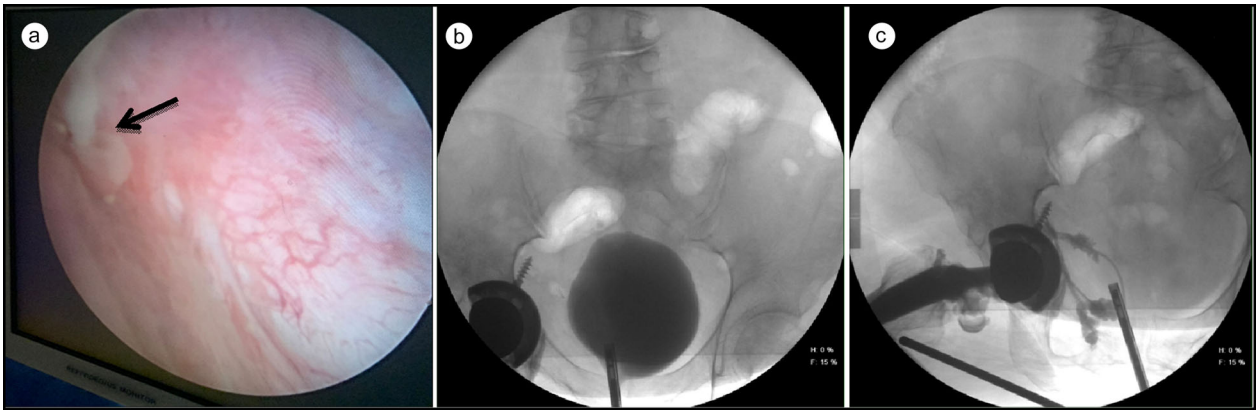

Figure 1. **(a)** Cystoscopy demonstrating right-sided purulence expressing through a mucosal polyp (arrow) 2 cm above the right ureteral orifice with erythema and bullous edema surrounding the area. **(b)** Cystogram revealing no apparent contrast extravasation into the perivesical or perirectal space. **(c)** Cystoscopic injection of contrast into the right-sided bladder lesion revealing contrast extravasation into the ischiorectal fossa and right acetabular hardware through a fistulous tract.

bladder was dissected down to a densely adherent right sidewall inflammatory mass. Tract and bladder portions were excised via a partial cystectomy, with dissection carried down to an inflammatory abscess pocket, which was dissected free and sealed with fibrin sealant. Following cystectomy, right orthopedic hardware was removed and replaced with an antibiotic-impregnated articulating spacer by the orthopedic team until further definitive hardware placement could be pursued.

A synovial fluid culture taken during the procedure indicated infection of the right prosthetic joint with methicillin-susceptible *Staphylococcus aureus* and *Actinomyces israelii*. *Actinomyces* sp. had not been documented on previous urine or tissue cultures. The patient was started on a daily ceftriaxone infusion therapy regimen and responded well. She had a documented negative urine culture and underwent delayed definitive right THA replacement. Six months after surgery, the patient has experienced no further lower urinary tract symptoms and is ambulating well without assistance.

DISCUSSION

Bladder injury associated with THA is rare; however, the urologist and general practitioner should recognize orthopedic hardware as a potential nidus for infection and fistula formation even years after hardware placement. The primary postoperative urological risk after THA is retention or infection related to catheterization. Painless hematuria, irritative voiding complaints, and abnormal urine cytology have been seen in other case studies of hardware migration and genitourinary involvement.[1] Other reports document vesicocutaneous fistula occurring decades after THA presenting with urinary symptoms and infection.[2] Hardware complications can be mitigated by following standard-of-care placement techniques such as use of the Wasielewski quadrant system for safe placement of acetabular screws in THAs.[3] Periprosthetic joint infection prevention strategies include preoperative skin bacterial decolonization, prophylactic antibiotics, antibiotic-impregnated cement use, and standard intraoperative sterility; however, prevention of late infections is still not well understood.[4]

The manifestation of this patient's fistula as a mucoid-producing bladder tumor made etiological identification difficult. Focal bladder masses that may mimic malignancy are a diagnostic dilemma.[5] In this case, the etiology of the bladder lesion was neither malignant nor a focal bladder mass, supporting the unusual nature of this patient's bladder lesion etiology and the relative difficulty in diagnosis. Additionally, late THA infection by *A. israelii* is unusual and due to hematogenous seeding from endogenous sites, like the genitourinary system and colon where there can be colonization.[6] Following its introduction with disruption of normal mucosal barriers through trauma, surgery, or infection, the *Actinomyces* genus has demonstrated the ability to invade tissue layers, causing formation of abscesses and fistulae.[7] Based on this case and similar cases, orthopedists should be aware of potential long-term bladder complications in post-THA patients, and urologists should consider the patient's orthopedic history in the evaluation of unusual urological symptoms that do not resolve with standard therapies.

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